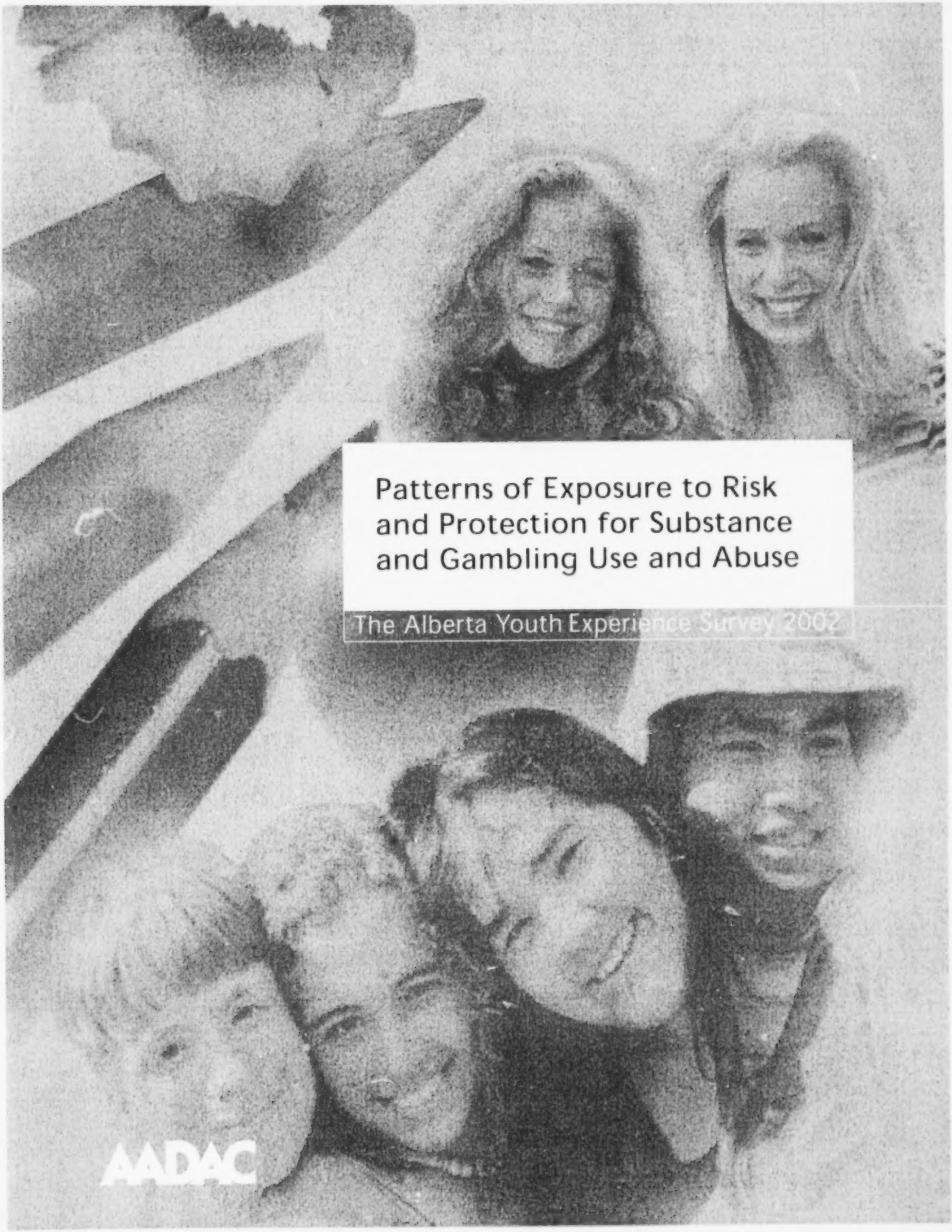

Patterns of Exposure to Risk and Protection for Substance and Gambling Use and Abuse

The Alberta Youth Experience Survey 2002

AADAC

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EXECUTIVE SUMMARY

The Alberta Youth Experience Survey 2002 (TAYES) presented information on adolescent substance and gambling use and abuse, specifically analyzing the risk factors related to increased use and abuse, and the protective factors related to decreased use and abuse.

Recent developments in prevention planning have focused on universal, targeted, and indicated programs. The goals of universal programs are to promote general health, to prevent use of substances by youth, or to delay the age at which youth start to use substances. Universal programs are most appropriately targeted toward those who have not started to use substances or to participate in gambling. The goals of targeted programs are to reduce the risks and to increase the protection among youth exposed to greater degrees of risk or lesser degrees of protection. Indicated programs are designed to reduce substance or gambling use and associated harms among those who have started regular use.

The prevention paradox states that a larger number of people at small risk may contribute more cases of actual harm than a small number at high risk. Prevention programs have therefore been designed to address large numbers of people at low risk in order to provide very small benefits to each individual, but a large benefit to the community. At the same time, these programs ask many people to bear a small cost for the substantial benefit of a few, an approach that is profitable for the few but somewhat inefficient for the many. Programs aimed at reducing substance and gambling abuse in communities can use two strategies to increase efficiency. They can add program elements to increase the benefits for the many to offset the costs. Alternatively, they can find methods to more precisely identify and intervene with the small number who are more likely to encounter actual harm. This paper contributes information that can help program strategists to decide what mix of adding benefits or narrow targeting is appropriate.

Most research on risk and protection examines the mechanisms and effects of specific factors or groups of factors. A number of researchers, though, have noted that the total number of risk and protective factors to which youth are exposed is important in its own right. Following that approach, youth who completed the TAYES questionnaires are organized into the following classifications:

- **resistant and risk-free**—exposed to a high number of protective factors and a low number of risk factors (53.7% of the sample)
- **vulnerable and risk-free**—exposed to a low number of protective factors and a low number of risk factors (5.7% of the sample)
- **middle ground**—exposed to some protective factors and some risk factors (36.2% of the sample)
- **resistant and risk-exposed**—exposed to both a high number of protective factors and a high number of risk factors (0.5% of the sample, too low a number for further analysis to be useful)
- **vulnerable and risk-exposed**—exposed to a low number of protective factors and a high number of risk factors (3.9% of the sample)

As expected, very low rates of substance and gambling use and abuse are found among the "resistant and risk-free" category. For example, 4.4% of the youth in this category used cannabis one or more times in the previous year. The proportion of youth in this category is smaller among youth in grades 10 to 12 than among youth in grades 7 to 9. Except for a greater prevalence of alcohol use, the substance and gambling use and abuse profiles for youth in this category are not substantially different between youth in junior and senior high school.

Higher rates of substance and gambling use and abuse are found among youth in the "vulnerable and risk free" category (e.g., 17.9% used cannabis one or more times in the previous year) than the

"resistant and risk-free" category, although the small number of youths in the "vulnerable and risk-free" category prevented complete analysis.

Substance and gambling use and abuse is generally higher among youth in the "middle ground" category than either the "vulnerable and risk-free" category or the "resistant and risk-free" category. For example, 25.9% of youth in the "middle ground" category used cannabis one or more times in the previous year. The size of this category is larger among youth in grades 10 to 12 than among youth in grades 7 to 9. Substance and gambling use and abuse profiles differed substantially between youth in junior and senior high school; youth in senior high have higher rates of use and abuse.

Finally, youth in the "vulnerable and risk-exposed" category showed the highest rates of substance use and abuse. For example, 82.0% used cannabis one or more times in the previous year. The size of this category is larger among youth in grades 10 to 12 than among youth in grades 7 to 9. In spite of already high prevalence of substance use and abuse among youth in grades 7 to 9, there are higher rates of substance use and abuse among youth in grades 10 to 12. Participation in most gambling activities did not show this pattern, with the exception of playing VLTs (video lottery terminals).

Although youth in the "vulnerable and risk-exposed" category exhibited a high level of substance and gambling use and abuse, they did not contribute most of the cases of substance and gambling use and abuse. Youth in the "middle ground" category contributed most to the community "burden" of substance and gambling use and abuse because they are a large part of the population and are exposed to moderately elevated risks and moderately reduced protection. For example, of all youth who reported using cannabis in the previous year, 75.0% are in the "middle ground" category.

Overall, the relatively large size of the "resistant and risk-free" category and the small size of the "vulnerable and risk-exposed" category are encouraging. The results suggest that increasing protection and decreasing risk are both important in preventing substance and gambling use and abuse. The results on exposure to risk and protective factors support the use of a "suite" of universal, targeted, and indicated programs.

As youth age, they are exposed to more risk factors and fewer protective factors. However, the results suggest that these changes do not occur at the same time for all youth. The fact that adolescents develop at different paces physically, emotionally and cognitively provides an extra challenge for program developers. In addition, recent program evaluation research suggests that prevention programs attract youth outside of narrowly defined targets and can produce benefits in unexpected ways. All these points suggest that integrated models of prevention programming need to be considered and that linking these programs to treatment services should also be planned.

INTRODUCTION

The Alberta Youth Experience Survey 2002 (TAYES) sought to answer questions about the proportion of Alberta youth who used alcohol, tobacco, or other drugs or gambled and the proportion of Alberta youth who used substances or participated in gambling in a harmful way. The survey also sought to investigate the factors that increased adolescents' protection from harmful substances, or increased their risk of substance use or abuse or gambling.

Three reports have been prepared based on TAYES: the *Summary Report*, the *Technical Report*, and the *Overview of Risk and Protective Factors*. This report is one of a series of special topical reports, which are intended to provide greater detail on TAYES results and relevant literature than is contained in the Summary Report (Alberta Alcohol and Drug Abuse Commission [AADAC], 2003a). Topical reports are intended for use by professional educators and addictions workers.

Those who plan programming for substance and gambling abuse face numerous challenges. Substance and gambling abuse is generated by genetic, psychological, and social factors and affects individuals and communities in many ways (American Academy of Pediatrics, 2001; Kinney, 2000; Inaba & Cohen, 2000; Hawkins, Catalano, Morrison, O'Donnell, Abbott, & Day, 1992). Prevention programming that is known to be effective requires longer sessions, more interactivity, and more frequent delivery during adolescence than are typically offered (Levin & George, 2003). Additionally, only a small portion of those in need actually seek treatment (Adlaf & Paglia, 2001; Poulin, 2002; Smith & Wynne, 2002). Targeting programs for maximum impact can be facilitated by research that identifies the nature and size of populations in need of prevention and treatment interventions. It is easier to consider alternative service delivery models with a clearer understanding of risk and protective factors among populations of interest.

The purpose of this report is to examine youths' patterns of exposure to risk and protection, and the relationship between patterns and substance and gambling use. This report addresses the following questions:

- How many youth are exposed to different patterns of risk and protection?
- Is the pattern of substance and gambling use and abuse different among youth exposed to different patterns of risk and protection?
- In which pattern of exposure to risk and protection are most youth who gamble or use substances found?

It should be noted that research into the interrelationships between risk and protective factors is quite recent and more sophisticated research is warranted than is presented here. Results described here should be considered to be exploratory and descriptive.

The prevention paradox states that a larger number of people at small risk may contribute more cases of actual harm than a small number at high risk. Prevention programs have therefore been designed to address large numbers of people at low risk in order to provide very small benefits to each individual, but a large benefit to the community. At the same time, these programs ask many people to bear a small cost for the substantial benefit of a few, an approach that is profitable for the few but somewhat inefficient for the many (Stockwell, 2001). Programs aimed at reducing substance and gambling abuse in communities can use two strategies to increase efficiency. They can add elements to increase the benefits for the many to offset the costs. Alternatively, they can find methods to more precisely identify and intervene with the small number who are more likely to encounter actual harm. Recent developments in prevention have begun to address this issue.

It is generally recognized that a number of "layers" of programming are best adapted to people with varying needs (Center for Substance Abuse Prevention, 2001). Health Canada (Roberts et al., 2001) defines these layers as universal, selective, and indicated prevention.

Universal

"Preventive activities can target a broad or "universal" population (e.g., all youth in grades 5 and 6) with the aim of promoting the health of the population, or preventing or delaying the onset of substance use."

"Measures often associated with universal prevention include awareness campaigns, school drug education programs, multi-component community initiatives, and, in the case of alcohol and tobacco, various measures to control their availability and price."

Selective

"Selective prevention aims to generally reduce the influence of these risks..." (i.e., "...academic problems, family dysfunction, poverty, and family history of substance use problems...") "...and to prevent or reduce substance use problems by building on strengths such as coping strategies (a personal resiliency attribute) and other life skills."

"Family-based approaches appear to hold particular promise for higher-risk children and youth."

Indicated

"Some young people who are using substances regularly will not as yet have met the criteria for dependency, but are at high risk of doing so. These youth usually experience an array of other health and social problems and benefit from indicated prevention programming that is typically more intensive still. Indicated prevention often involves an outreach component to identify, engage and work with these youth to minimize the harm associated with their lifestyle."

In addition to these three layers of prevention, AADAC includes information provision as the broadest level of services as well as counselling and treatment services, a more intensive intervention for those who have developed a serious involvement with substances or gambling. AADAC information tells the public about the Commission's services and offers the best available knowledge on substance use and abuse so that individuals, communities, and organizations can act in their own best interests. Treatment includes components such as case management, outpatient treatment, residential treatment, and detoxification services. AADAC refers to "selective programs" as "targeted prevention programs."

Recent developments in public health planning models allow for more nuanced and efficient programming to reduce the burden of addictions. The development of best practices principles and model programs helps addiction workers to select interventions that have some proven track record. However, delivering programs in the real world

requires adaptation and flexibility. Most importantly, no one program fits all people. Research that clarifies who should be recruited to which kind of programs may be helpful, and information that can reduce the inefficiency implied by the prevention paradox should help improve the allocation of scarce resources.

LITERATURE ON RISK AND PROTECTION

This review focuses on patterns of exposure to risk and protective factors for adolescent substance use and abuse (there is no literature on this topic for youth gambling). The literature on risk and protection is reviewed extensively elsewhere (George, Dyer, & Levin, 2003; Roberts et al., 2001).

The recent public health programming models have incorporated research on risk factors and, to a lesser extent, protective factors. The concept of risk factors is well understood. Risk factors are defined as either life events or experiences that are statistically associated with an increase in problematic behaviour such as alcohol use, other drug use, and gambling (Hawkins, Catalano, & Miller, 1992).

The concept of resiliency was developed in recognition that some youth who are exposed to hostile environments appear more able to cope, even thrive, than do others. Wolin and Wolin (1995) define resiliency as "successful adaptation despite risk and adversity" (p. 419). Such successful adaptation is the result of protective factors that exist within individuals and their environments, factors that counteract the impact of risk factors. In spite of research that suggests that resilience is part of a dynamic interplay of human systems, resiliency is most commonly treated as a characteristic of individuals (Health Canada, 1997).

While attending to adaptive capacity marks an important development in thinking about harms, it is incomplete as it is framed as "adapting to risk." Recent work in adolescent alcohol and drug research has focused on a broader range of adaptive capacities and processes labelled "protective factors." Protective factors are defined as life events or experiences that mitigate the effects of exposure to risk factors. The result is the reduced incidence of the problem behaviour (Garmezy, 1985; Rutter, 1979, as cited in Pollard & Hawkins, 1999).

The notion of resistance to risks is not new (Healy & Bronner, 1936, as cited in Sprott, Jenkins, & Doob, 2000), but it has been largely ignored except in psychological studies of resiliency. Rutter (1987) discussed protective mechanisms and vulnerability and proposed that vulnerability was one end of a continuum of protection. This view is used here, but broadened beyond the individual focus taken by Rutter. While Rutter conceived of "vulnerability" and "protection" as characteristics of individuals, the idea of vulnerability (or the absence of protection) can be extended to other domains of life, such as peer groups, families, communities, schools, workplaces, and societies. In addition, it seems clearer to refer to the dimension of protection as having vulnerability at one end and resistance at the other. Resistance means being able to challenge the effects of risk.

While most research on risk and protection has tried to understand how different factors work, recent research (Newcomb & Felix-Ortiz, 1992; Calkins, Banks, Greene, & Wiemar, 2002) has confirmed that the number of risk and protective factors, more or less regardless of which factors are considered, is important in predicting substance use and abuse. The fact that the actual number of risk and protective factors seems important in itself (separate from the type of factors or domain within which each factor operates) gives a wide range of options to those who plan interventions to reduce risk and increase protection. At the same time, interventions may be more complex to plan and implement since a larger number of factors may be at work. Sorting out which youth should be exposed to what interventions may be made easier with a "map" or classification system of higher and lower exposure to risk and protection.

A classification scheme describes different patterns of exposure to risk and protection and is helpful in understanding the influence of risk and protective factors and the interrelationship of these factors with substance use and abuse.

RESEARCH QUESTIONS

The key research questions for this paper are:

- How many youth are exposed to different patterns of risk and protection?
- Is the pattern of substance and gambling use and abuse different among youth exposed to different patterns of risk and protection?
- In which pattern of exposure to risk and protection are most youth who gamble or use substances found?

The answer to the first question helps define the relative emphasis on universal, targeted, and indicated programs. The answer to the second question provides information on the extent to which youth exposed to a particular pattern of risk and protection share similar substance use and abuse experiences; knowing this aids in the design of interventions. The answer to the third question helps assess whether programs can be targeted more precisely (and efficiently) by knowing patterns of exposure to risk and protection.

METHODOLOGY

This report is based on secondary analysis of data collected for TAYES 2002. Methods for the survey are reported in detail in The Alberta Youth Experience Survey 2002: Technical Report.

The study is based on a school survey of 3,394 Alberta youth in grades 7 to 12 in October and November 2002. The sample was designed as a stratified random cluster sample with selection proportionate to size. The sample was stratified by five regions aggregated from regional health authority boundaries as they existed in April 2002, and by grade. The survey was administered in randomly selected classrooms in 89 schools in 39 school divisions throughout the province.

Ethics approval was obtained from a duly constituted ethics review board consistent with the Tri-Council Statement: Ethical Conduct for Research Involving Humans (Alberta Heritage Foundation for Medical Research, 2001). The survey was conducted in compliance with Alberta's Freedom of Information and Protection of Privacy Act (1995) and Health Information Act. Active, informed parental consent was required. Student and parent names were kept private to schools that participated in the survey and research staff had no access to these names.

The questionnaire and survey processes were pre-tested in one school with students in grades 7 to 12 (the French language version of the questionnaire was pre-tested with a French immersion class). Research staff administered an 84-question survey in October and November of 2002. The Alberta Youth Experience Survey 2002: Technical Report (AADAC, 2003b) outlines measures taken to reduce misrepresentation by students answering the questionnaire. The response rate of 52% is consistent with similar surveys using active, informed consent.

The study included questions about a small number of demographic variables (age, gender, grade in school, family structure, number of siblings, and source of income) and about the frequency of using substances and participating in gambling activities in the previous year. Three measures of hazardous or harmful use were used. In general, hazardous use refers to daily consumption or participation; harmful use refers to at least regular participation or consumption with additional problem consequences including dependence. Alcohol problems were measured with the Alcohol Use Disorders Identification Test (AUDIT, Babor, Korner, Wilber, & Good, 1987). Gambling problems were measured with the South Oaks Gambling Screen Revised for Adolescents (SOGS-RA, Winters, Stinchfield, & Kim, 1993). Cannabis problems were measured with a three-item scale developed by Adlaf and Paglia (2001).

Table 1 outlines the risk and protective factors included in TAYES. Specific measures for these risk and protective factors are found in The Alberta Youth Experience Survey 2002: Technical Report.

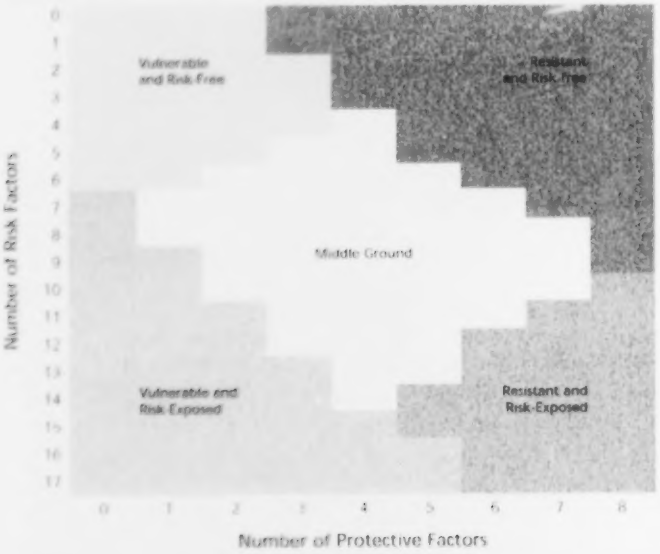
Table 1: Substance Use and Gambling Activities included in TAYES, 2002

Domain	Protective Factors	Risk Factors
Individual	• Social skills • Participation in pro-social activities	• Grade at first start for alcohol, tobacco, cannabis • Perceived ease of access to alcohol, tobacco, cannabis, gambling, other specific drugs
Peer	• Peer influences	• Peer risk behaviour
Family	• Parental monitoring	• Mother's support • Father's support • Family discord • Family history of substance abuse • Tobacco use in family • Parental approval of smoking, drinking, and using drugs
School	• Very high school marks (80% to 100%) • School connection	• Disconnection from school • Poor grades (below 60%) • Signs of leaving school early
Community	• Positive adults in neighbourhood • Availability of pro-social activities	• Neighbourhood disorganization

The number of risk and protective factors to which each youth is exposed is calculated as follows. First, each risk factor is re categorized as "present" or "absent" based on whether an individual's score is above or below scale midpoints, except for a few factors with established cut-off points. Protective factors are treated in the same manner (the Technical Report has complete details). The total number of risk factors and protective factors is then counted with one point for each "present" risk or protective factor. The number of risk factors ranges from 0 to 19, and the number of protective factors ranges from 0 to 8.

In order to develop a classification for exposure to risk and protection, the total number of risk and protective factors to which each youth is exposed is combined to create a risk-protection exposure grid. Each case is placed on the grid (Figure 1) according to the number of risk and protective factors. The grid classifies combinations of risk and protective factor pairs.

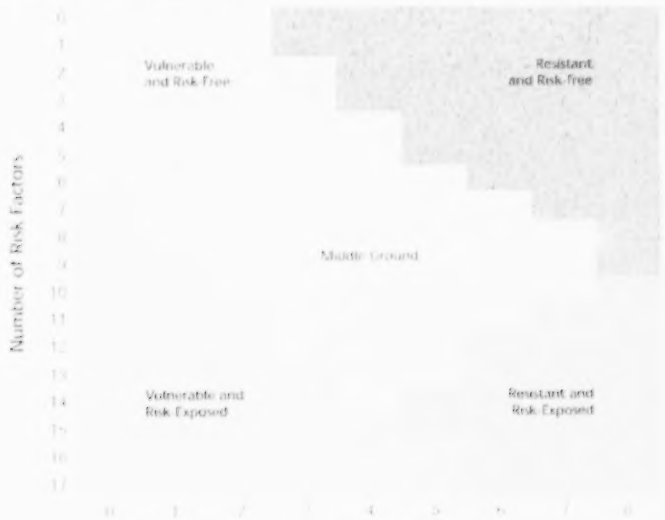
Figure 1: Patterns of Exposure to Risk and Protection – Classification Grid



Youth exposed to many protective factors and few risk factors are considered "resistant and risk-free." Youth exposed to few protective factors and few risk factors and are considered "vulnerable and risk-free." Youth exposed to many protective factors and many risk factors are considered "resistant and risk-exposed." Youth exposed to few protective factors and many risk factors are considered "vulnerable and risk-exposed." Finally, youth exposed to some protective factors and some risk factors are considered "middle ground."

Two levels of statistical significance are used to assess the data. All comparisons of risk and protection exposure and substance use and abuse are statistically significant at the .0005 level using chi-square tests of significance for categorical and one-way post hoc analysis of variance for interval level data, indicating that risk and protection exposure is important in understanding how substance and gambling use and abuse occur. Specific differences between patterns of exposure to risk and protective factors are compared using more sophisticated tests. Data are analyzed with Epi-Info 2002 Complex Samples procedures (Sullivan et al., 2002). Epi-Info Complex Tables and Complex Means procedures are used for nominal and interval data respectively. Both procedures are specifically designed for the analysis of stratified cluster sampling where weighted data are used. Both procedures produce confidence intervals, or a high and low estimate, respectively, of percentages or averages. Confidence intervals (CIs) are used to determine whether differences between groups are statistically significant or due to chance (the .05 level is used meaning that the same results would be found in 19 of 20 surveys conducted in exactly the same way). If the confidence intervals do not overlap, then the difference between the two groups is statistically significant. In the results section, only those comparisons that are statistically significant have been reported in the text. Differences between percentages and averages in the tables should not be interpreted as statistically different unless they are reported in the text.

Figure 1: Patterns of Exposure to Risk and Protection – Classification Grid



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RESULTS

How many youth are exposed to different patterns of risk and protection?

Of the 3,394 cases available for analysis,

- 1,821 (53.7%) are classified as "resistant and risk-free"
- 192 (5.7%) are classified as "vulnerable and risk-free"
- 1,227 (36.2%) are classified as "middle ground"
- 18 (0.5%) are classified as "resistant and risk-exposed"
- 131 (3.9%) are classified as "vulnerable and risk-exposed"
- five (0.1%) have missing information

The "resistant and risk-exposed" category contained too few cases for reliable reporting, however, the category is included in analyses.

Demographically, youth in "resistant and risk-free" situations tend to be younger (47% in grades 7 and 8), from families with two natural parents (83.7%), and from southern health regions in Alberta. Youth in "vulnerable and risk-free" situations tend to be male (68.4%), younger (56.0% in grades 7 and 8), from families with two natural parents (73.2%), and from the Capital or northern health regions (41.8% and 20.7%, respectively). Youth in "middle ground" situations tend to be older (50.1% in grades 11 and 12), from single parent or reconstituted families (35.5%), and from larger centres, not rural areas (51.6% and 16%, respectively). Youth in "vulnerable and risk-exposed" situations tend to be male (68.4%), older (41.3% in grades 11 and 12), and in non-traditional family situations (33.4% have one parent, 12.8% in reconstituted families, 5.8% in no family).

Is the pattern of substance and gambling use and abuse different among youth exposed to different patterns of risk and protection?

Table 2 shows the percentage of youth in each of the risk and protection exposure categories who reported using various substances or participating in gambling activities one or more times in the previous year.

Youth in the "vulnerable and risk-exposed" category report far greater prevalence of gambling behaviour and of use for all substances than all other categories. Those in the "middle ground" category report more substance use and gambling participation than those in the "vulnerable and risk-free" and "resistant and risk-free" categories.

Substance and gambling use among youth in the "vulnerable and risk-exposed" category

Over half of those in the "vulnerable and risk-exposed" category report use of alcohol, tobacco, cannabis, and magic mushrooms or mescaline as well as playing cards for money and betting on sports events with friends. By contrast, in the "resistant and risk-free" category, fewer than three in 10 youth report alcohol use, 4.4% report cannabis use, and fewer than 3% report cigarette, chew, or other drug use. When we compare youth in the "vulnerable and risk-exposed" category with youth in the "resistant and risk-free" category, we find that confidence intervals do not overlap for any drug or gambling activity except Bingo, Other Lottery, and Sport Select.

In general, the degree of difference in gambling participation between "vulnerable and risk-exposed" and "resistant and risk-free" youth appears to be lower than that found in the use of the licit and illicit drugs included in TAYES.

Substance and gambling use among youth in the "middle ground" category

When the "middle ground" and "resistant and risk-free" categories are compared, confidence intervals again do not generally overlap (confidence intervals overlap for Other Lottery, but not for other drugs of use for which percentages are reported in the table). However, the differences between the two groups are smaller than those

Table 2: Substance and gambling use within risk and protection exposure categories**

	Risk and Protection Exposure Category				
Substance or Gambling Activity	Resistant and Risk-Free (n=1821)	Vulnerable and Risk-Free (n=192)	Middle Ground (n=1227)	Vulnerable and Risk-Exposed (n=131)	TOTAL
Alcohol	28.7%	45.8%	82.8%	98.7%	56.3%
Cannabis	4.4%	17.9%	46.4%	82.0%	27.6%
Cigarettes	2.6%	8.9%	25.9%	65.2%	16.2%
Magic Mushrooms or Mescaline	0.8%	*	15.1%	58.4%	10.4%
Chewing Tobacco or Snuff	2.2%	5.6%	10.7%	36.9%	7.8%
Inhalants	2.6%	4.2%	8.1%	12.0%	5.6%
Club Drugs	*	*	7.7%	31.0%	5.3%
Uppers	*	*	5.5%	23.2%	4.0%
Hallucinogens	*	*	6.7%	14.0%	3.9%
Cocaine	*	*	4.4%	18.8%	2.9%
Crack Cocaine	*	*	4.6%	14.3%	2.8%
Downers	*	*	2.7%	18.5%	2.3%
Heroin or Opium	*	*	2.1%	*	1.4%
Steroids	*	*	2.3%	*	1.2%
Scratch Tabs	19.5%	32.5%	40.5%	48.2%	30.8%
Cards for Money	10.1%	21.1%	32.5%	59.7%	23.0%
Sporting Events with a Friend	13.6%	15.2%	26.5%	51.2%	21.1%
Bingo	7.5%	6.1%	11.4%	14.2%	9.5%
Other Lottery	4.4%	*	7.9%	15.3%	6.7%
Sport Select	1.1%	*	5.7%	12.9%	3.7%
VLTs	0.7%	*	4.1%	24.0%	3.3%
Sporting Events Online	1.0%	*	4.9%	10.3%	3.2%

* Too few cases to produce accurate estimates.
** Due to sampling variation, not all of the differences between exposure categories reported in this table differ significantly. Comparisons made in the text of this report are statistically significantly different at the .05 level.

found between "resistant and risk-free" and the "vulnerable and risk-exposed" groups.

Although few comparisons can be made between the youth in the "middle ground" and "vulnerable and risk-free" categories, the "middle ground" category tends to be more likely to report use than those in the "vulnerable and risk-free" category (with these exceptions, for which confidence intervals overlap—use of inhalants and chewing tobacco or snuff, and gambling involving scratch tabs, cards for money, and betting on sports events with friends).

Youth in the "middle ground" category are less likely than those in the "vulnerable and risk-exposed" category to report use and participation for all substances and types of gambling behaviour with the exception of inhalant use, cocaine, crack, Sports Select, and betting on sporting events with friends.

Harmful and hazardous use and patterns of exposure

Table 3 shows the percentage of youth in each of the risk and protection exposure categories that reported hazardous or harmful levels of substance use or gambling participation. The pattern of results shown in prevalence of use is repeated when hazardous and harmful use is considered. Again, there is a smaller difference for hazardous or harmful gambling than for hazardous or harmful use of alcohol and cannabis. The results show that the prevalence of hazardous or harmful use of alcohol and prevalence of indicators of cannabis dependence are higher among youth in the "vulnerable and risk-exposed" category than among other categories. Although the differences between this category and others are statistically significant, the small number of cases in the "vulnerable and risk-exposed" category warrants cautious interpretation.

Table 3: Hazardous and harmful substance use and gambling by exposure to risk and protection**

	Risk and Protection Exposure Category				
Type of Hazard or Harm	Resistant	Vulnerable	Middle Ground	Vulnerable and	TOTAL
Hazardous or Harmful Alcohol Use	2.9%	*	19.1%	64.6%	13.0%
Hazardous or Harmful Gambling	1.9%	9.1%	7.2%	30.7%	9.5%
2 or 3 Indicators of Cannabis Dependence	0.2%	*	8.7%	29.1%	5.8%

* Too few cases to produce accurate estimates.
** Due to sampling variation, not all of the differences between exposure categories reported in this table differ significantly. Comparisons made in the text of this report are statistically significantly different at the .05 level.

In which pattern of exposure to risk and protection are most youth who gamble or use substances found?

Table 4 shows the percentage of the total substance users or gambling participants that are found in each risk and protection exposure category. The top row of the table shows the risk and protection exposure classifications as well as the percentage of the sample in the classification. If there were no differences in substance use and gambling participation between the categories, the percentages reported in the table would not differ much from the percentage listed in the top row (e.g., 46.9% of alcohol users would be resistant and risk-free, instead of only 24.1%).

More than half of the reported substance use and gambling participation occur in the "middle ground" category. Of the respondents who use steroids, 84.5% are members of this category, as are 78.4 % of users of hallucinogens and 75.0% of cannabis users. Respondents in the "vulnerable and risk-exposed" category account for the next largest portion of the prevalence of substance use, except with respect to alcohol and inhalants. Respondents in the "resistant and risk-free" category account for the second largest proportion of gambling activity (excluding Sport Select and VLT play), but this is because more students belong to this category than any other. In all cases, the two risk-free categories ("resistant and risk-free" and "vulnerable and risk-free") show lower participation in substance use and gambling than their representation in the population would suggest: although the "resistant and risk-free" are 46.9% of the population, for example, only 3.5% of those who say they have used magic mushrooms or mescaline are from the "resistant and risk-free" category. Youth in the "middle ground" and "vulnerable and risk-exposed" categories, on the other hand, have higher participation in substance use and gambling activities than their sheer numbers would predict (those from the "middle ground" make up 43.5% of the youth studied, yet they represent between 51.6% and 84.5% of the participants in the various activities studied).

Table 4: Percentage of the total substance users or gambling participants found in each risk and protection exposure category**

	Risk and Protection Exposure Category			
Substance Use or Gambling Participation	Resistant and Risk-Free (n=1821; 46.9% of weighted sample)	Vulnerable and Risk-Free (n=192; 4.6% of weighted sample)	Middle Ground (n=1227; 43.5% of weighted sample)	Vulnerable and Risk-Exposed (n=131; 4.5% of weighted sample
Alcohol	24.1%	3.7%	64.0%	7.8%
Cannabis	7.4%	2.7%	75.0%	13.6%
Cigarettes	7.4%	2.4%	70.1%	18.0%
Magic Mushrooms or Mescaline	3.5%	*	65.2%	26.0%
Chewing Tobacco or Snuff	13.3%	3.1%	60.9%	21.4%
Inhalants	22.1%	3.1%	64.9%	9.7%
Club Drugs	*	*	66.9%	27.4%
Uppers	*	*	61.2%	26.0%
Hallucinogens	*	*	78.4%	16.4%
Cocaine	*	*	67.2%	28.5%
Crack Cocaine	*	*	72.7%	22.7%
Downers	*	*	54.0%	37.1%
Heroin or Opium	*	*	71.7%	*
Steroids	*	*	84.5%	6.2%
Scratch Tabs	29.9%	4.5%	57.3%	7.0%
Cards for Money	20.6%	4.0%	62.2%	11.6%
Sporting Events with a Friend	30.6%	3.0%	54.9%	10.9%
Bingo	37.4%	2.8%	52.8%	6.2%
Other Lottery	31.4%	*	51.6%	10.1%
Sport Select	14.1%	*	67.2%	15.2%
VLTs	9.3%	*	54.2%	32.5%
Sporting Events Online	14.1%	*	67.0%	14.1%

* Too few cases to produce accurate estimates.
** Due to sampling variation, not all of the differences between exposure categories reported in this table differ significantly. Comparisons made in the text of this report are statistically significantly different at the .05 level.

Table 5: Percentage of the total hazardous or harmful substance users or gamblers found in each risk and protection exposure category **

	Risk and Protection Exposure Category			
Type of Hazard or Harm	Resistant and Risk-Free (n=1821; 46.9% of weighted sample)	Vulnerable and Risk-Free (n=192; 4.6% of weighted sample)	Middle Ground (n=1227; 43.5% of weighted sample)	Vulnerable and Risk-Exposed (n=131; 4.5% of weighted sample)
Hazardous or Harmful Alcohol Use	10.7%	*	64.7%	21.8%
Hazardous or Harmful Gambling	12.3%	4.2%	59.8%	22.9%
Two or Three Indicators of Cannabis Dependence	*	*	67.2%	23.2%

* Too few cases to produce accurate estimates.
** Due to sampling variation, not all of the differences betweeen exposure categories reported in this table differ significantly. Comparisons made in the text of this report are statistically significantly different at the .05 level.

Table 5 shows the percentage of the total hazardous or harmful substance users or gamblers that is found in each risk and protection exposure category. Hazardous and harmful alcohol use, hazardous and harmful gambling participation, and indicators of cannabis dependence are found most frequently in the "middle ground" category, followed by the "vulnerable and risk-exposed" category, and then the "resistant and risk-free" category.

How does age influence the pattern of substance and gambling use and abuse among youth exposed to different patterns of risk and protection?

As youth age, exposure to risk increases and exposure to protection decreases; therefore, the analysis shown in Tables 3 and 4 is conducted with youth in grades 7 to 9 and grades 10 to 12. Results are presented in Table 6. Analyses are only conducted for selected substance use and gambling activities because of the low frequency of response to less commonly used drugs and less common gambling activities and to the relatively small size of the "vulnerable and risk-free" and "vulnerable and risk-exposed" categories. While analyses are conducted for all three measures of abuse (AUDIT, SOGS-RA, and Adlaf and Paglia's three-item Cannabis Dependence scale), caution is required in interpreting results for the grade 7 to 9 groups.

Table 6: Substance and gambling use and abuse within risk and protection exposure categories, by grade**

	Risk and Protection Exposure Category			
	Resistant and Risk-Free		Vulnerable and Risk-Free	
Type of Substance Use, Gambling Participation, Hazard or Harm	GR 7-9 (n=1260, 29.5% of weighted sample)	GR 10-12 (n=502, 12% of weighted sample)	GR 7-9 (n=132, 3.6% of weighted sample)	GR 10-12 (n=26, 1.2% of weighted sample)
Alcohol	16.8%	49.6%	42.0%	56.5%
Cannabis	1.9%	8.4%	15.7%	25.2%
Cigarettes	1.1%	5.1%	8.4%	*
Magic Mushrooms or Mescaline	*	1.3%	*	*
Played Cards for Money	10.5%	9.5%	20.6%	*
Bet on Sporting Events with Friends	13.4%	14.0%	13.3%	*
Played Scratch Tabs	19.3%	20.0%	33.2%	*
Played VLTs	0.9%	*	*	*
Hazardous or Harmful Alcohol Use	*	7.2%	*	*
Hazardous or Harmful Gambling	2.0%	3.0%	*	*
2+ Indicators of Cannabis Dependence	*	*	*	*
	Middle Ground		Vulnerable and Risk-Exposed	
Type of Substance Use, Gambling Participation, Hazard or Harm	GR 7-9 (n=545, 13.1% weighted sample)	GR 10-12 (n=650, 30.4% weighted sample)	GR 7-9 (n=69, 1.8% weighted sample)	GR 10-12 (n=60, 2.7% weighted sample)
Alcohol	69.5%	88.7%	96.9%	99.8%
Cannabis	23.5%	56.0%	72.8%	83.6%
Cigarettes	12.8%	31.4%	61.8%	67.4%
Magic Mushrooms or Mescaline	6.7%	18.7%	52.9%	61.8%
Played Cards for Money	30.2%	33.5%	61.2%	58.8%
Bet on Sporting Events with Friends	26.7%	25.4%	40.9%	58.1%
Played Scratch Tabs	35.9%	42.5%	46.6%	49.2%
Played VLTs	1.2%	5.2%	6.2%	35.3%
Hazardous or Harmful Alcohol Use	7.1%	23.6%	52.4%	71.4%
Hazardous or Harmful Gambling	10.9%	14.4%	47.9%	56.2%
2+ Indicators of Cannabis Dependence	12.1%	10.5%	18.2%	36.1%

* Too few cases to produce accurate estimates.

** Due to sampling variation, not all of the differences between exposure categories reported in this table differ significantly. Comparisons made in the text of this report are statistically significantly different at the .05 level.

Of the grade 7 to 9 subgroup, 61.3% fit the "resistant and risk-free" profile, 7.4% are classified as "vulnerable and risk-free," 27.3% are in the "middle ground" category, and 3.7% are in the "vulnerable and risk-exposed" category. Of the grade 10 to 12 subgroup, 33.1% are in the "resistant and risk-free" category, 2.4% are considered "vulnerable and risk-free," 58.6% are in the "middle ground" category, and 5.2% are in the "vulnerable and risk-exposed" category.

Youth in the "resistant and risk-free" category

The number of youth in grades 10 to 12 exposed to conditions consistent with being "resistant and risk-free" is about half the number of youth in grades 7 to 9 exposed to the same conditions. The youth in grades 7 to 9 in this category have the lowest rates of use or problems with alcohol, cigarettes, other drugs, VLT play, and hazardous or harmful gambling. Participation in playing cards for money, betting on sports events with friends, and buying scratch tabs did not follow this pattern as sharply, although prevalence rates are lower. Those in grades 10 to 12 are more likely to drink, use cannabis, and smoke than their younger counterparts, but are much less likely to do this than are youth of any age in the "middle ground" or "vulnerable and risk-exposed" categories. Differences and similarities between the "resistant and risk-free" categories and the "vulnerable and risk-free" categories are not statistically significant, since such a small number of students are categorized as "vulnerable and risk-free."

Youth in the "vulnerable and risk-free" category

In spite of the small number of cases, youth in grades 7 to 9 in the "vulnerable and risk-free" category seem to have similar alcohol and tobacco use rates as youth in grades 10 to 12 in the "middle ground" category.

Although a small number of youth are in the "vulnerable and risk-exposed" category, there appear to be few differences between the youth in grades 7 to 9 and in grades 10 to 12 within the "vulnerable and risk-exposed" category.

Youth in the "middle ground" category

In grades 10 to 12, youth in the "middle ground" category exhibit more variety in patterns of substance and gambling use and abuse than is found in other categories. This difference is much less marked for youth in grades 7 to 9. First, the proportion in this category doubles, perhaps mirroring the decline in the "resistant and risk-free" category. Second, there is an increase in the proportion of youth who use alcohol, tobacco, or other drugs; gamble on VLTs; or use alcohol in a hazardous or harmful manner. There are no differences in the proportion of youth who bet on sporting events with friends, play scratch tabs, play cards for money, gamble, or use cannabis in a harmful or hazardous manner.

Summary of findings

About half of the TAYES 2002 sample is in the "resistant and risk-free" category. The youth in this category are younger and more likely to come from families with two natural parents than other categories. The prevalence of substance and gambling use and abuse among youth in this category tend to be low. However, because of its relatively large size, about one in ten of those classified as hazardous or harmful alcohol users, and one in ten of those classified as hazardous or harmful gamblers, belong to this category. The proportion of youth in the "resistant and risk-free" category declines by approximately 50% from junior to senior high school, and the prevalence of substance use increases, although it remains below the rates found in other exposure conditions.

Slightly more than one third of youth are in the "middle ground" category. Demographically, youth in this category tend to be older, more urban, and more likely to live in families with one or no natural parent than other categories. The prevalence of substance and gambling use and abuse are significantly higher among youth in this category

than in the "resistant and risk-free" and "vulnerable and risk-free" categories, but lower than the "vulnerable and risk-exposed" category. Because of the large number of youth in the "middle ground" category, the increased exposure to risk, and the decreased exposure to protection, the bulk of substance and gambling use and abuse is found in this category. The proportion of youth in the "middle ground" category doubles from junior high school to senior high school, and the rates of use of substances, participation in VLT play, and harmful and hazardous substance use increase. Participation in selected gambling activities, hazardous or harmful gambling, and reporting of two or more indicators of cannabis dependence do not follow the same pattern.

Slightly more than one in 20 youth are exposed to conditions consistent with being "vulnerable and risk-free." Demographically, youth in this category are similar to the "resistant and risk-free" category, except that youth in the "vulnerable and risk-free" category are more likely to be male and from northern parts of the province. Although the small sample size for this category made comparisons with other categories unstable, we found somewhat higher rates of substance and gambling use and abuse than we did in the "resistant and risk-free" category. Few stable comparisons could be made between youth in junior high school and those in senior high, although those exposed to conditions consistent with being "vulnerable and risk-free" in junior high appear to have similar rates of alcohol and tobacco use as do those in the "middle ground" category in senior high.

About one in 25 in the sample is in the "vulnerable and risk-exposed" category. Youth in this category are more likely to be male, older, and living in non-traditional family situations than other categories. Substance and gambling use and abuse prevalence is pervasive in some cases and high in the remaining cases. Although only one in 25 of the sample is in this category, one in five youths who report hazardous or harmful alcohol use, indicators of cannabis dependence, or hazardous or harmful gambling participation belongs to this category.

Few in the sample are exposed to conditions consistent with being "resistant and risk-exposed."

Overall, few differences in gambling participation and hazardous and harmful gambling are seen between categories. However, hazardous and harmful gambling appears to be more strongly related to risk and protection exposure than to participation in gambling activities.

Overall, youth in the "resistant and risk-free" category use substances and gamble much less than other youth and are less likely to drink, gamble, or use cannabis in a hazardous or harmful way. These results hold when older and younger youth so exposed are compared. By contrast, youth in the "vulnerable and risk-exposed" category consistently report high levels of substance and gambling use and abuse, even when older and younger youth exposed to such conditions are compared. The relatively small number who are exposed to conditions consistent with being "vulnerable and risk-free" tend to occupy a space between those in the "resistant and risk-free" and "middle ground" categories.

DISCUSSION

It seems straightforward to suggest that

- universal programs be available to youth in the "resistant and risk-free" category
- targeted prevention programs be available to youth in the "middle ground" and "vulnerable and risk-free" categories
- indicated programs be available to youth exposed to conditions consistent with being "vulnerable and risk-exposed"

Overall, the greatest number of youth who use substances or gamble, including those who use in hazardous or harmful ways, is in the "middle ground" category. For most of those in the "middle ground" category, universal programs would be all that are required; however, if reducing the overall prevalence of substance and gambling use and abuse is a goal, selected and targeted prevention programs would have to recruit heavily among these youth. If programs can be targeted using risk and protection indicators, then efficiency improves because those in the "resistant and risk-free" category should not need much further screening. However, since a large proportion of those in the "middle ground" category would not be appropriate for selected or targeted prevention, a substantial degree of "economic inefficiency" in program design and delivery is unavoidable.

The interesting questions are how to design and implement programs for different exposure types and how to recruit appropriate people to those programs.

Youth in grades 7 to 9 are most likely to be in the "resistant and risk-free" category; however, it is important to note that a significant portion of this age group is already exposed to conditions consistent with being "middle ground," "vulnerable and risk-free," and "vulnerable and risk-exposed" and that substance use and gambling has already begun for many youth. Thus, even though more than half of the youth in junior high should at most need universal programs, it is prudent to expect that targeted prevention could be useful for the 40% of this age group in the "middle ground," "vulnerable and risk-free," and "vulnerable and risk-exposed" categories. Also, the minority could benefit from selective prevention, including screening for indicated prevention, and counselling and treatment services.

Best practice programs (Levin & George, 2003; Hawks, Scott, & McBride, 2002) are developmentally appropriate and content is designed according to the age of the audience, and aim to offer information and skills that are immediately relevant to situations that youth encounter. "Booster" sessions are recommended.

The connection between patterns of exposure and the use and abuse of substances raises questions about matching programs not only to age but to the degree of risk and protection that youth are experiencing. There is a real challenge in determining at what age to start programs and when to provide boosters because adolescent development and exposure to risk and protection vary so much. One way to deal with this variability is to use effective programs that can incorporate design flexibility (Backer, 2001; Howard Research, 2003; Harvey-Jansen & Schmitt-Boshnick, in preparation). For example, use a normative social influence approach to gather information on the beliefs the program's target group about substances and to develop strategies to counter these beliefs (Bruvald, 1993; White and Pitts, 1997, as cited by Hawks et al., 2002). To do this, program staff need skills in modifying evidence-based programming and research support. Normative approaches are appropriate when substance and gambling use rates are trending down, but face challenges when these rates increase because increased prevalence in use can be interpreted as new norms for use (Paglia & Room, as cited by Hawks et al., 2003). An alternative strategy is to implement tiered programs in communities or schools that have a universal programming base with access to targeted and indicated prevention based on selection criteria (e.g., Dishion, Kavanagh,

Schneiger, Nelson, & Kaufman, 2002). The relative feasibility of these approaches needs to be determined.

The well-known goals of delaying the onset of use and maintaining low prevalence apply to universal prevention and should take precedence for youth in grades 7 to 9. Use is still relatively rare, the majority are in the "resistant and risk-free" category, and the size of this category decreases by high school, at which time substance and gambling use and abuse are more prevalent. However, current prevalence rates among youth of high school age, particularly those who are not in the "resistant and risk-free" category, suggest that harm minimization approaches should be considered.

Selective or targeted prevention programs should also be available to youth in grades 7 to 9. Those in the "middle ground" for risk and protection constitute the second largest category among youth in these grades. For youth in the "middle ground" category, approaches that communicate the true prevalence of substance and gambling use and that focus on the risks and harms associated with substances may have more appeal. Because the largest proportion of hazardous or harmful alcohol and gambling behaviour and indications of cannabis dependence occur in this category, screening for problems with alcohol, other drugs, and gambling should be considered within interventions targeted for the "middle ground" category.

Those in the "vulnerable and risk-exposed" category exhibit high levels of substance use and abuse. The pessimistic interpretation of these patterns outlines significant programming challenges. To the extent that these youth are surrounded by others like themselves, their world view is likely to be one in which everybody drinks, smokes, and uses cannabis, or in which many people use drugs and gamble. When devising strategies such as re-norming prevalence of use, program strategists must consider the almost universal use of alcohol and cannabis and the heavy use of tobacco in this category.

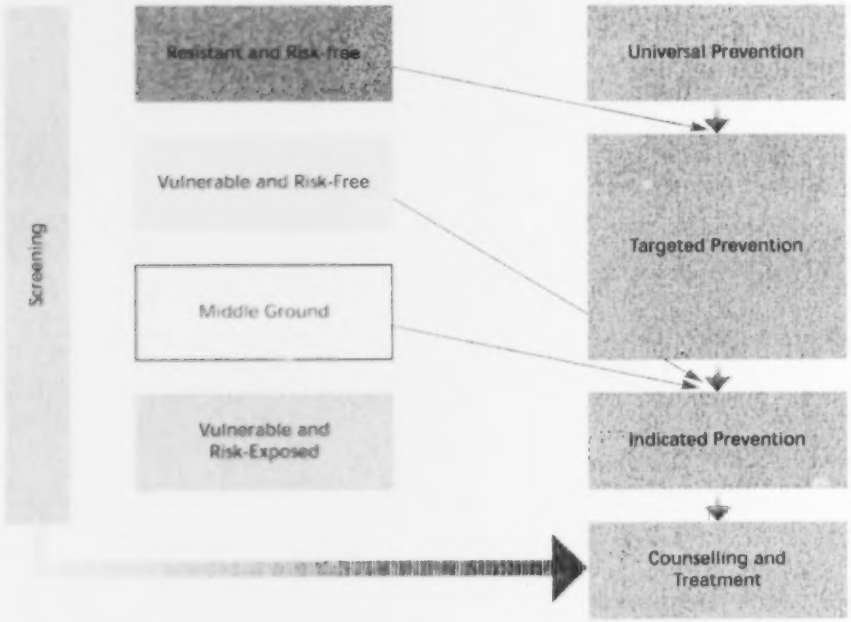
However, other data in the study and other research suggest that this "worst-case" interpretation is incomplete. Most adolescents obtain alcohol and drugs through friends, gamble with friends, and date, attend school functions, and participate in pro-social activities with friends. It is probable that the majority of those in the "vulnerable and risk-exposed" category interact significantly with the much larger "middle ground" category and may be recruited to programs of interest to this category.

The likelihood that youth in the "vulnerable and risk-exposed" category interact fairly frequently with other youth suggests that other youth should be "inoculated" against adopting the less desirable behaviour exhibited by youth in this category. It also suggests that strategies should encourage youth in the "vulnerable and risk-exposed" category to adopt the more positive behaviour of other youth. Separating youth in this category from others may limit the "adoption of deviance" to some degree, but it risks creating greater harms (Dishion & McCord, 1999).

Although few youth seem exposed to conditions consistent with being "vulnerable and risk-free," this may be an important category for interventions. Since they are younger and not yet exposed to as many risks as youth in the "middle ground" and "vulnerable and risk-exposed" categories, efforts to increase protection or minimize the adoption of or exposure to risk may result in significant benefits.

A general summary of the relationship between exposure to risk and protection and suggested focuses for programming is shown in Figure 2.

Figure 2. Relationship between exposure to risk and protection and program focus

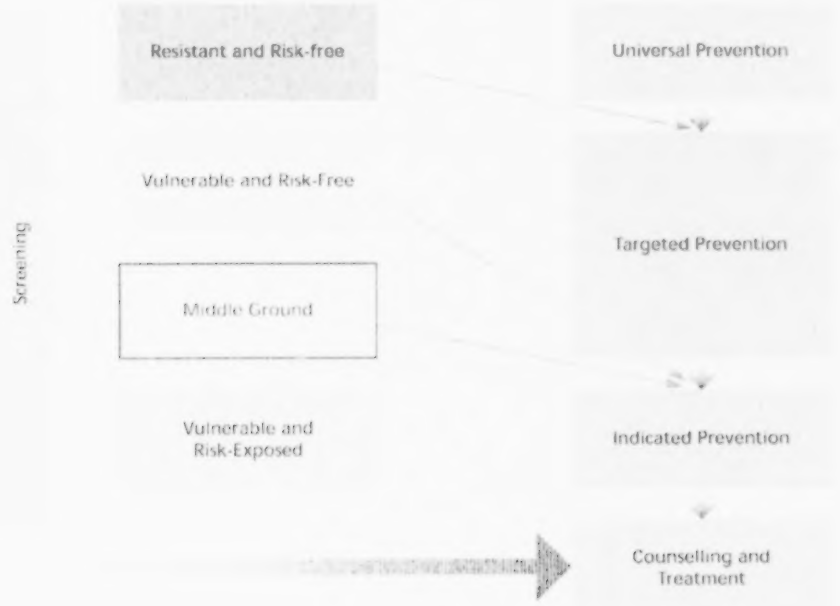


Few youth are exposed to conditions consistent with being "resistant and risk exposed" and this research can say little more about them. This finding is not surprising, given that as exposure to risk increases, exposure to protection decreases. Further research on those exposed to these conditions may provide insight into multiple layers of resilience. It would be interesting to know the extent to which those exposed to these conditions act (as in the resiliency literature) to increase their own protection and to what extent other systems, such as schools, families, and communities, act to increase protection. It would be equally interesting to know whether attempts are made to reduce risk. We do not know whether youth exposed to these conditions benefit from naturally occurring supports or from formal programs, nor do we know what barriers these systems and programs face in reducing risks.

The correlation between risk and protective factors is of interest, specifically the extent to which "push" and "pull" factors are at work in this correlation. Do increases in exposure to risk and decreases in exposure to protection occur simultaneously or are there sequences? To what extent do youth make choices that affect their exposure to risk and protective factors and to what extent are external factors at play? Do youth move in and out of patterns of risk and protection exposure and, if so, what factors affect this movement? These kinds of questions require longitudinal research studies.

A clearer understanding of substance and gambling use and abuse can be gained by combining simple indicators of exposure to risk and protection into a classification system. The system essentially points out that risk and protection factors are important. The demographic analyses suggest some broad clustering, but programming

Figure 2. Relationship between exposure to risk and protection and program focus



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A clearer understanding of substance and gambling use and abuse can be gained by combining simple indicators of exposure to risk and protection into a classification system. The system essentially points out that risk and protection factors are important. The demographic analyses suggest some broad clustering, but programming

still faces the challenge of identifying, recruiting, and engaging appropriate clientele. Universal programming makes intuitive sense for those in the "resistant and risk-free" category. However, since universal programs are unlikely to exclude those with greater exposure to risk and less exposure to protection, it is advisable that universal programming build in an "escalation path" that allows for effective links with targeted and indicated programs.

CONCLUSIONS

If risk and protective factors were equally distributed over the measures and the population, the five risk and protection exposure categories would be equal in size. Overall, the relatively large size of the "resistant and risk-free" category and small size of the "vulnerable and risk-exposed" category are encouraging. This optimism is supported by the observation that both the "middle ground" and "vulnerable and risk-exposed" categories are similar in age (and older than the "resistant and risk-free" and "vulnerable and risk-free" categories). The very small size of the "resistant and risk-exposed" and "vulnerable and risk-free" categories, however, indicates that risk and protection are correlated. Youth who have greater risk are also more likely to have less protection. This double jeopardy is of concern.

Exposure to combinations of risk and protection changes over the course of adolescence, generally in the direction of increased risk and reduced protection. The changes in exposure do not follow a neat timetable, making program design more complex. While the primary goals of substance and gambling use and abuse programs for younger adolescents should be raising age of onset and reducing prevalence of use, the same programs will have to deal with a substantial minority of youth who are at greater risk, have fewer protections, and are more likely to use substances or participate in gambling. A small number of youth will have experienced a range of problems, including daily gambling, use of cannabis or alcohol, and dependence. Regardless of the goals established for universal programs aimed at reducing onset and prevalence, practical experience suggests that program staff and resources will be diverted to the more concrete and critical needs. A better solution would be to design programs more comprehensively from the start.

One way to look at adolescence is that it is a period in which youth must increasingly learn how to cope with the risks and rewards of the adult world. As youth get older, they are more exposed to risk and less exposed to protection. While substance use and gambling are not necessary for life, total eradication of their use has eluded humankind. Since youth of high school age increasingly are in the "middle ground" category, programming should shift to an increased emphasis on harm minimization. However, an increased focus on harm minimization should not ignore the desirability of maintaining the positive lifestyles of older youth in the "resistant and risk-free" category. Programs developed to pursue universal and targeted prevention goals in reducing substance and gambling use and abuse must unavoidably deal with more seriously involved youth. As with the discussion on programming for younger adolescents, the results suggest implementing multiple strategies to reduce the burden of substance abuse.

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